APRIL, 1983

The I/O Connector

The Newsletter of the San Diego Atari Computer Enthusiasts

PRESIDENT'S REPORT

I was pleased to see everyone out at the last meeting. If I seemed a little disorganized, it was that I was. I had just returned from the Computer Faire in San Francisco. So here is a report on the Faire.

The big news in the ATARI area is the Rana Disk Drive. They had one there flashing its little lites and doing nothing as it was a mock-up. The single density will be out in May at $339 and the double density will be out in June at $549. Atari had a nice booth there. Nothing new at the show. ATARIWRITER will be out in May and was being demonstrated. Also DIG DUG. For those of you who read my "write Atari" message last month, I am sad to report that Bill Polich is no longer with Atari. Now write to Andy Soderberg at the same address. At the User Group open house, ATARI LOGO was shown. It seems like a good implementation of LOGO. It will be out this Fall. Brøderbund Software is now selling the Bank Street Writer for the Atari. We will have a demonstration of it at the next meeting. They also have several new games out. Watch the ads. Datamost will be releasing new software for the Atari also. Gary Koffler, formerly with Datasoft, is now Director of new Product Development. I was hoping to see MICRO MAINFRAME's new disk drive but didn't make connection. I came across a great book at the Faire. It is called "Mapping the Atari." It's a COMPUTE! publication. It is not only a memory map but has explanations and examples for almost every memory location in your Atari. Dennis Costarakis and I went to the Synapse open house Thursday evening. We saw many interesting new games in development plus they have started an application software division to develop business and utility software. John Harris is now working for them. We will have demonstrations of some of their new products at the next meeting. I hope to have some slides from the show at the next meeting.

George Risk Industries has a 800 type detachable keyboard for the 400. It does not disable the 400 keyboard. Until April 20, it is $80 for the keyboard only, or $159 for the keyboard, enclosure and installation kit. Call 800-445-5218 if you're interested.

The Personal Computer Society has several special interest groups that some of you might be interested in. A few are: DIG SIG for disabled users; PERSONAL INVESTMENT SIG and ROBOTICS SIG. If any are of interest, call me for information.

Norm Davis has volunteered to be Membership Chairman. Thank you, Norm. He will be keeping track of memberships and signing up new members at the meeting. If you can't get to the meeting, give Norm a call and he will send you our membership application.

Randy Turner, who works for Sega, has volunteered to teach a graphics oriented assembly language class if there is enough interest. More at the April meeting.

Last but not least, here is an exerpt from a letter from On-Line Computer Center. "On-Line Computer Center is now having a 20 to 40 percent-off sale on all Atari software in the store. We are currently out of Atari hardware, but will special order items for SDACE members at 10 percent off list with one-third down. Our service technician, Jim, has been doing an excellent job on Atari service repairs and appreciates all your referrals. We have enjoyed working with your organization and hope this sale and special order offer will be of interest to them.

Sincerely, John I. Rigoli"

EDITOR'S OUTPUT

What happened to the typesetting?

This month I have opted to simplify somewhat. I have composed the lion's share of the Connector in the comfort of my tent, rather than spending untold hours downtown at the typesetting keyboard. The result: a slightly less professional look, but deep down, the same ol' Connector.

These have been some tumultuous times for me, in both my personal and professional life. Happily, things seem to be working out more smoothly than I had anticipated. With this in mind, I am pleased to announce that I plan to continue to edit the Connector, for the duration.

Good luck to Ted Langlett and Tom Bennett who've gone to careers up north. Thanks as usual to our regular contributors. Special thanks to Ara Dirtadian, as well as father and son team Steve and Jason Schock, for their unsolicited contributions.

No more room. See you at the meeting.

INSIDE

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SECRETARY'S REPORT

President Dick Hiatt opened the meeting at 6:45, fresh from the San Francisco Computer Fair. He introduced the officers and went right to the first item on the agenda. Due to Ted Langlet's current situation, we have been left, (once again), without a Vice President. The Constitution states that when one of the major offices has been vacated mid-term, the President may appoint a new officer with the membership's approval. Dick appointed Tony Tait, who was accepted. Paul Caesar was appointed to Tony's old position of Treasurer and was also accepted. We still have some positions to be filled. If you are interested, please contact Dick or Tony.

Advertising Director:

Gathers advertising for the I/O Connector.

Program Chairman:

Organizes the Guest Speakers, etc. for the monthly meetings.

Ron Miller gave his report on the North County Group, even though he hasn't attended a meeting recently... .

Chuck made the announcement for the Beginner's Group. If you need help with programming in BASIC, this is where you need to be. Call Don for a verification of place and time. Chuck also announced the Library's status: Growing, but not from the heart (YOU!). The Library needs your contributions. The BBS will be up as soon as the converion to a four disk system is completed.

SAN DIEGO ATARI COMPUTER ENTHUSIASTS

is an independent, nonprofit organization and user's group with no connection to ATARI Corporation, a Warner Communication Company. Membership fees are currently $10.00 annually from January 1983 to January 1984. Membership includes free access to the computer program library, subscription to "The I/O Connector", and classes, when held. Permission to reprint articles in any noncommercial publication is permitted, without written authorization, as long as proper credit is given.

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SUBMISSIONS
Are most welcome. Deadline is the 28th of each month.

If you liked those stands that we had at the computer show, Chuck will sell you one, made to order, for $12!

Dave Schultz, (without his tie), recomended Tax Advantage, a tax preparing program for the ATARI. "It's the most fun I've had doing my taxes.", he said. Dave is either getting a hefty refund or needs to see a doctor... .

Jerry Nation announced that the tax program from Rocky Mountain Software has not been shipped yet, two months after the initial order and several follow up calls. This looks like a company that should probably be avoided.

National University is going to be publishing a computer equiptment directory called the BYTE BUYER. If you are interested in receiving it, drop a letter to: BYTE BUYER P.O. Box 83086 San Diego, CA 92138.

Ivy Childs, a sociology student at SDSU, passed out a questionaire at the meeting. The information is for a thesis project on microcomputer dispersion. The results of the study will be made available to the club. Thanks to all of you who participated.

Dick came back with a couple of jewels from San Francisco. One was Kids and the Atari, a tutorial book on the Atari computers. Dick says it looks quite good. Another gem was Galactic Travel. Want to see the midnight sky from IO? (That's one of Jupiter's moons, not you standing on this newsletter, silly!) This program will let you see it. It can generate a star map for any place in the galaxy. It also includes a game. It is produced by Centurion Software. If you ordered the group subscription to A.N.A.L.O.G., you will be receiving issue #11 as the first issue.

Barton Buehler demonstrated Disk Wiz, a disk utility written in BASIC with machine language subroutines. It is compatible with the NEC 8025 and Epson printers.

Nestor was appointed as the head of the Hardware Group. This group is for those of you who know a little about hardware and wish to do "strange things" with your ATARI. This is NOT the place to bring your ailing 810 and say "make it work.". This is for hardware experimenters only. If you are intersted, give Nestor a call. Nestor demonstrated the ATR-8000. This device is like a super 850 interface. It allows you to hook up almost any disk drive to the ATARI, along with printers, modems and who knows what else. The cost is $500. For an extra $250, the memory on the device can be expanded to 64K and will operate CP/M on your ATARI. This is a full-blown CP/M with BIOS, PIP, and all those other nice things.

After the break, slides were shown of the Consumer Electronics Show, courtesy of Michigan ACE. (Can you believe what people will do to a joystick these days?).

Finally, there were program demos of Necromancer, Survivor, Way Out and others. Several people have taken these home and will demo them at the April meeting. Also demonstrated were QIX, a new game from Atari, based on and arcade game, and, for those who stayed, The Bookkeeper, a new bookkeeping ledger system from Atari.

REMINDER

Our next North County Atari Meeting will be held on 19 April at 8081 Mira Mesa Blvd., which is a church across the street and a little west of the Mira Mesa Cinemas. These are working meetings with computers and programs. No agenda or speeches.

Paul Caesar's
BEST BUYS

This month was very busy in the retail field for Atari. Three computer stores are dropping the Atari, one store has closed, two new stores opened, and one major department store started selling Atari (Atari 400's for $189 at the grand opening). It looks as though Atari computers will be very rare in "computer stores." In order to compete with Commodore, Texas Instruments, and Timex, Atari has cut prices and profit margins on their products. This is forcing specialty stores to drop the Atari line to stay profitable. We benefit from lower prices, but receive less support from discount houses and department stores. I guess the idea is that the Atari computer is so simple that instruction is not necessary.

The stores that are closing out their Atari line are: On-Line Computers in La Mesa and both Computer Stores Int'l. The store which has closed is A.S.C. in La Mesa; it has been replaced by Southland Computer Systems, 6792 University Ave., San Diego, phone 286-6262. They have reduced prices on some Atari software. JC Penneys has started carrying the Atari 800, 400, and related Atari brand products. I know that the Fashion Valley store stocks these and I imagine that other Penneys stores also do. They do not give a discount, but do have good sale prices. Another store which can help you out is Computer Think Tank, 3947 Governor Dr., S.D., phone 457-0677. They discount computers and software 10 to 25% and the owner is very helpful.

A new store of note is Computer Control Center, 5005 Cass St., Pacific Beach, phone 273-5005. This store is managed by Nestor Sanchez (of SDACE fame) and his partner Vince. They are selling Atari hardware, software, and related products (printers, CPM boxes, etc.) at very reasonable prices. Computer Control will also repair your Atari and Nestor is available for consulting about programming problems.

If you need furniture for your computer, check Omni Enclosures, 450 Parkway Plaza #208, El Cajon, phone 449-6281. They sell modular units, very nicely finished which would make any computer feel loved.

That's all I have for this month. If anyone has information from North County or other areas, please let me know. Until then, happy computing.

ANNOUNCEMENTS

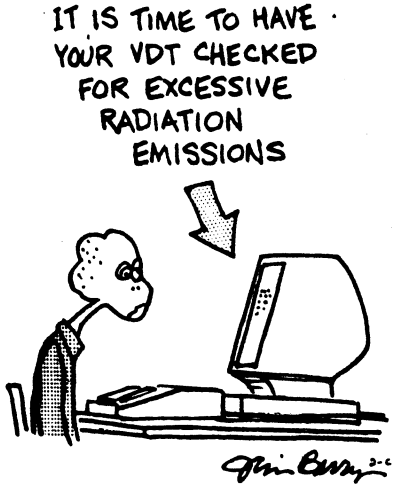
PROGRAMMING LANGUAGES AND ATARI COMPUTERS

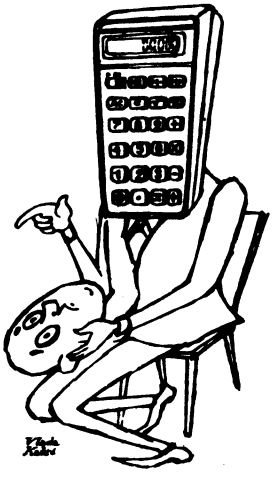
Our guest speaker at the next San Diego Atari meeting will Mr. Ron Miller. Ron is the manager of the Systems Analysis & Simulation department at General Dynamics. He has been a very active member of our Atari club for several years. Ron will discuss programming languages on the Atari computer. He will cover Atari BASIC, BASIC A+, MICROSOFT BASIC, Pascal, Assembler, PILOT, FORTH, LISP, C and ACTION (a new language from OSS). As a basis for comparing these languages, Ron will describe the differences between a compiler, an assembler and an interpreter. He will also summarize what the Atari operating system does for you. This presentation will be made in a language most people will be able to understand (English). So if you have wondered what all these programming languages are about, this next meeting will be of interest to you.

Ron Miller's
FORTH AVENUE

Many club members have been expreimenting with fig FORTH version 1.1. We now have version 1.4 in the club library and I think you will all enjoy the new version much more thanthe old one. The new version shows you the top of your screen so you can see what is happening. It has commands for the printer and a nice editor and many more things. I will have copies of the documentation and disk at the nxt North County meeting. At that time we will also experiment with this new version and see how neat it really is.

I bought another version of FORTH put out by Pink Noise Studios ($95). This is an excellent implimentation of FORTH but the beginner would have trouble getting going (in my opinion). It has the best and fastest editor I have seen and it has many neat features for the systems programmer. It's creator, Bob Gonsalves, really knew what he was doing. Anyone interested in seeing this version of FORTH can do so at the next North County meeting.





"Hey! I just made the sportscaster sock the anchorman!"

SOFTWARE REVIEW

SURVIVOR
By Richard Carr
Synapse Software
5327 Jacuzzi St., Ste. I
Richmond, CA 94804
32K Disk, Cassette, or Cart.

Synapse Software has issued yet another interesting program in SURVIVOR, a space shoot-em-up that offers a challenge for up to four players.

The scenario is a familiar one: you are the lone survivor of a fleet of starcruisers whose mission is to destroy four heavily guarded space forts. The enemy Xenogryphs continuously hurl trackers and fighters at you while you work on destroying the forts. The forts are heavily armed with gunners that await you after their barricades are penetrated. Seven skill levels guarantee a challenge for even the skilled trooper. (The seventh skill level is near impossible to beat!)

You can fly your Starwedge Cruiser solo, with one or two gunners, and/or a propulsion engineer, through a scrolling galaxy complete with asteroids and other dangers. (Sorry 1200XL'ers, you can only use two of the players.) As you destroy all of the gunners of one fort, the fort disintegrates and you move on to the next.

SURVIVOR is a very well designed space game that offers many game options to keep the game interesting. Along with the skill level and player numbers options, you can switch back and forth between a manual and automatic firing mode by simply depressing the "A" key. You can regulate your propulsion to accelerate and decelerate gradually or instantaneously by using the "T" key on your keyboard. If you find yourself desperately in trouble, you can activate one of the seven "smart bombs" which instantly destroys all enemy ships on the screen (and you WILL need them!)

The Starwedge Cruiser resembles the triangular spaceship that we all have seen from the famous Asteroids game, but the firing speed is tremendously faster. When using the two-gunner mode, your cruiser is equipped with two 360 degree cannons mounted on the front and back of the ship. Playing this game with four players is very challenging for all.

The screen scrolling is very smooth and adds to the dimension of the game. The cruiser rotation is very clean for the up-down, left-right positions, but is less responsive for the diagonal positions. Perhaps Mr. Carr designed the cruisers this way intentionally to all to the difficulty.

If you are not competely bored with space games, SURVIVOR should be another welcome game to the Atari owner's library. With the many options available onthis game, as your skill level grows, you will still be offered the challenge of SURVIVOR.

SOFTWARE REVIEW

NECROMANCER
Reviewed by Ara Dirtadian

It is truly amazing that this game was developed by SYNAPSE! Ten different people played this game and not one came up with any positive remarks!

There are three different screens to this game and you must accomplish the tasks on all three if you are to destroy the mighty Necromancer!

The first screen has several tasks. The first task is to plant seeds at random locations on the screen. This is harder than it seems because if you plant a seed in the wrong place it will be harder to defend and you are limited with a certain amount of seeds.

The next task is to protect your seeds from on-coming monsters. If the monsters reach any seed, they will devour it instantly. But on the other hand, if the monsters do not destroy a seed wthin ten to fifteen seconds, the seed blossoms into a beautiful tree.

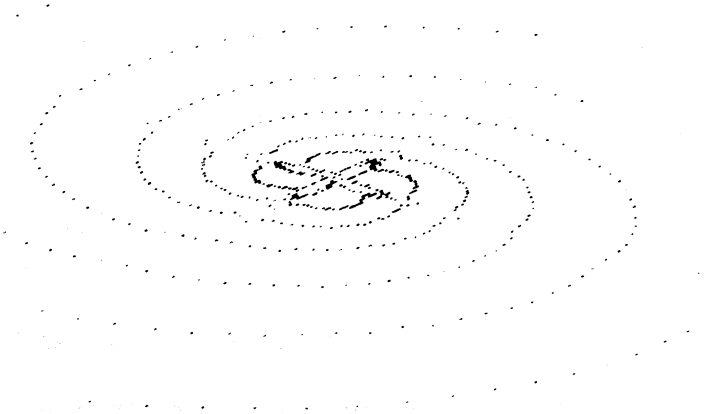
The third task is to protect your trees from a mysterious virus which can be deadly if unnoticed within five to ten seconds. Points are awarded for all the trees that are alive at the end of this screen.

The second screen is interrelated with the first screen since the trees you saved onthe first screen are used here. There are eight pits on this screen, each containing a spider's larvae. The only way to kill the larvae is to plant a tree into a pit and the roots will grow and destroy the larvae. If you don't plant a tree, the larvae will hatch into a deadly spider which can kill you at any moment. There are five rooms of this same screen and each one is harder than the last.

And NOW, and the third and final screen, you have the chance to destroy the Necromancer (who is actually another wizard just like you). The Necromancer has the ability to hyperspace around the screen at any time. Your only weapon is to touch the necromancer with your site (wisp) and in doing so, he will be destroyed! Good luck!

As you have probably guessed, this game did not impress me like most of the other great SYNAPSE games. But then again, maybe I just don't understand the plot since I am just thirteen years old. Maybe you'll like it.

(Editor's note: Thanks to Ara for his very well done contribution!)



SOFTWARE REVIEW

THE ADVENTURES OF PROTO
REVIEWED BY STEVE SCHOCK
ASSISTED BY JASON MICHAEL SCHOCK, AGE 5

Requires 16K Tape/24K Disc, ATARI BASIC Cartridge and 1 Joystick.

The Adventures of PROTO from Educational Software, Inc., is a series of three games for children from ages 4 to 9.

The young user is offered a menu of "3 exciting, creative adventures with PROTO, a friendly alien learning about our planet."

MARS-MALLOW is a relatively simple game in which one must move PROTO, accompanied by a large canister, back and forth in order to catch "yummy Martian treats" as they are dropped from a moving spacecraft. Three game speeds are offered.

COLORING BOOK is a joystick controlled sketchpad which is reminiscent of the old ETCH-A-SKETCH toy which has been around for years. This program does, however, offer three different pen colors, three drawing speeds and four pen widths. In addition, completed drawings may be saved to disc or tape for Mom and Dad's approval at a later time.

PLAYTUNE turns a portion (top two rows) of the ATARI keyboard into a simple piano or organ (option). Each key struck will produce a note while displaying the symbol for that note (e.g. C,F,A#) on the screen. As in the preceeding program, your "composed" tunes may be saved to disc or tape.

While all three programs are somewhat cute, I felt that they were only of limited educational value. Visual appeal and ease of use for children is average to above average. Documentation for parents is relatively complete. The SAVE ability of the latter two programs is a nice feature, however, not enough to strongly recommend this software. The biggest flaw perhaps, as with many game programs, is a lack of ability to hold the user's interest.

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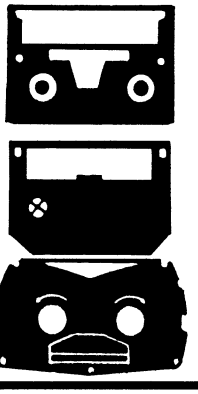

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ATARI UPDATE

ATARI

PRODUCT UPDATE
ATARI HOME COMPUTER SYSTEM

ATARI® BASIC Reference Manual Update

This product update contains a number of corrections and additions to the *ATARI BASIC Reference Manual*.

Page 1. This definition is missing from the **TERMINOLOGY** list:

Floating Point Number: A number containing an integer part, a decimal point, and a fractional part. The total number of significant digits in a floating point number, excluding the exponent, may be either nine or ten. This depends on whether the exponent is an even or odd multiple of 10.

Page 6. This information pertains to the **ARITHMETIC OPERATORS** subtraction and exponentiation:

Note: Avoid negating zero, as this will produce an invalid number. For example, if you type

```
PRINT -0
```

the result will be

```
-0E-<8
```

Note: Since the algorithm used to generate exponents (^) is only an approximation, you cannot obtain integer results with it—for example, 2^2=3.99999996. To correct this, use the following technique:

```
X=2^2
PRINT INT (X+.5)
4
```

Page 7. This Note regards the use of the **LOGICAL OPERATORS**:

Note: Avoid using the statement PRINT A=NOT B, as the results are not predictable. Essentially, any PRINT statement with a NOT operator will be unpredictable.

Page 13. This Note is in reference to **SCREEN EDITING**:

Note: Large amounts of editing may lock up the system. It's recommended that programs under development be stored to cassette or diskette periodically (every 30 or 40 edits) with the SAVE or CSAVE command.

Page 20. This Note regards **ON/GOSUB** statements:

Note: If an ON/GOSUB expression evaluates to a number greater than the number of subroutine entries, then a POP statement will be necessary to clear the stack (see POP command, Section 4).

Page 22. Further information on **RESTORE (RES.)**:

The RESTORE statement will not generate an error if the line number referenced does not exist. Instead it will RESTORE to the next larger line number in the program. Care should be taken to update RESTORE statements when renumbering a BASIC program.

Page 25. Some additional information on using the **INPUT (I.)** statement:

When executing an INPUT from the screen, avoid moving the cursor away from and then back to the same line, otherwise, the wrong data may be input. Specifically, the INPUT prompt will be included in the INPUT string.

If a string of 128-255 characters is INPUT, then RAM locations 1536-1664 will be overwritten. This area is normally reserved for storage of programs or data. (See the *ATARI Tech Reference Notes*.)

To INPUT strings of more than 127 characters, use the GET command and store the values into a string (see Section 5, OPEN/CLOSE and PUT/GET commands).

Note: The maximum number of characters that can be INPUT from the screen is 120. The maximum for other devices is 255.

Note: Make sure that every INPUT statement has a variable after it, otherwise, unpredictable results may occur.

ATARI

Page 26. This regards the use of the **LOAD (LO.)** command.

Note: If a program is loaded that is too large for the available memory space, it may give unpredictable results without an error message.

This Note should follow the **LPRINT (LP.)** command description.

Note: An LPRINT command with a semicolon at the end will cause the following LPRINT statement to print on the next 40-column tab. A 40-column printer will move to the next line in such a case. To use the semicolon effectively, use the OPEN statement for the printer, then write to the printer with a PRINT statement (see OPEN/CLOSE and PRINT commands, Sechor. 5).

Page 27. This information pertains to the file spec definition:

Note: Be sure to include the closing quotation marks on a filespec parameter, especially when putting multiple statements on one line. For example,

```
OPEN #1, 4, 0, "D:TEST".STOP
```

will work, but

```
OPEN #1, 4, 0, "D:TEST:STOP
```

will not function correctly.

Page 28. This is an addition to the **POINT (P.)** section:

Note: To update a file, you must open it with a 12 in aexp1.

In the last paragraph under **PRINT (PR. or ?)**, the first sentence should read:

A comma tabs every 10 spaces.

The following sentence should conclude the final paragraph on **PRINT (PR. or ?)**.

However, if the last character to be printed (as in a string with quotation marks) is a [redacted]R or [redacted]U, then the next PRINT will begin at the end of the current line.

This note should then conclude this section on **PRINT (PR. or ?)**:

Note: In rare circumstances data printed to a diskette may have part of the BASIC program embedded in it. If this occurs, retry the operation.

This Note regards the **PUT (PU.)/GET (GE.)** section:

Note: In certain circumstances the GET function may modify other variables within the program. To avoid this, PRINT any number to the screen between each GET.

Page 30. Here is a corrected version of the table—note in particular the correction on cmdno 32.

cmdno	OPERATION	EXAMPLE
3	OPEN	Same as BASIC OPEN
12	CLOSE	Same as BASIC CLOSE
13	STATUS REQUEST	Same as BASIC STATUS
17	DRAW LINE	Same as BASIC DRAWTO
18	FILL	See Section 9
32	RENAME	XIO 32,#1,0,0,"D:TEMP.CARDS
33	DELETE	XIO 33,#1,0,0,"D:TEMP.BAS"
35	LOCK FILE	XIO 35,#1,0,0,"D:TEMP.BAS"
36	UNLOCK FILE	XIO 36,#1,0,0,"D:TEMP.BAS"
37	POINT	XIO 37,#1,A,B
38	NOTE	XIO 38,#1,X,Y
254	FORMAT	XIO 254,#1,0,0,"D2

ATARI

Page 33. The last sentence in the paragraph about the **CLOG** function should read:

CLOG(0) through CLOG(1) are inaccurate and should not be used.

Page 34. The last sentence in the paragraph about the **LOG** function should read:

LOG(0) through LOG(1) are inaccurate and should not be used.

Page 38. The last line in the first paragraph should read:

was stored there previously.

Page 39. The first sentence should read:

Upon execution, the screen displays THE SQUARE ROOT OF 10000 IS 100.

In the second paragraph, the last line should read:

number 1000000000.

This is additional information on the **VAL** function:

Only the numeric field will be translated, while the text will be ignored. For example:

```
VAL("5SUM")=5
```

This information pertains to **String Concatenation**:

Note: BASIC cannot move strings of 256-character multiples correctly. String lengths should be checked, if any string contains a multiple of 256 characters, add or subtract one character from the amount to be moved.

In Figure 7-6, the correct result of the program on the left is:

```
BCD@
```

Page 42. Some additional information on using the **DIM (DI.)** statement:

Make sure that the DIM statement does not contain a space between the string or array name and the left parenthesis of the dimensioned amount, otherwise, the following will happen—

```
DIM L (10) becomes DIM L10)
```

—and this variable can no longer be referenced.

Note: The command COM is identical to DIM and may be used in its place.

Page 43. This is an additional Note for the **DIM (DI.)** section.

Note: Due to a discrepancy in boundary checking, arrays of up to 32766 by 32766 in size can be dimensioned. The programmer should size the array ahead of time to ensure that there is no "virtual" storage space.

Additional information on using the **CLR** command:

The second sentence in the last paragraph, beginning "It also clears ...," should be deleted.

The CLR command will not initialize the values in strings and arrays.

ATARI

Page 45. Here is a corrected version of **TABLE 9.1**.

TABLE 9.1—TABLE OF MODES AND SCREEN FORMATS

Gr Mode	Mode Type	Horiz (Columns)	SCREEN FORMAT Vert (Rows) Split Screen	Vert (Rows) Full Screen	Number Of Color Registers	Split Screen	RAM Required (Bytes) Full Screen
0	TEXT	40	–	24	1½	–	96[illegible]
1	TEXT	20	20	24	5	674	67[illegible]
2	TEXT	20	10	12	5	424	420
3	GRAPHICS	40	20	24	4	434	43[illegible]
4	GRAPHICS	80	40	48	2	694	691[illegible]
5	GRAPHICS	80	40	48	4	1174	1[illegible]7[illegible]
6	GRAPHICS	160	80	96	2	2174	2184
7	GRAPHICS	160	80	96	4	4190	4200
8	GRAPHICS	320	160	192	1½	8112	8136

Page 49. The last sentence under **PLOT (PL.)** should read:

"The range of points begins at 0 and extends..."

Page 50.

In **TABLE 9.3**, the color PURPLE should be inserted after PINK in the first column, and the number 5 should be inserted after 4 in the second column.

Page 51. The sentence directly under **TABLE 9.4** should read:

"DEFAULT" occurs if no SETCOLOR statement is used.

Page 53. Here is a corrected version of **TABLE 9.5**.

MODE, SETCOLOR, COLOR TABLE

Default Colors	Mode or Condition	SETCOLOR (aexp1) Color Register No	Color (aexp)	DESCRIPTION AND COMMENTS
LIGHT BLUE	Mode 0 and all text windows	0	Color data actually determines character to be printed	–
		1		Character luminance (same color as background)
DARK BLUE		2		Background
BLACK		3		Border
		4		
ORANGE	Modes 1 and 2 (text modes)	0	Color data actually determines character to be printed	Character
LIGHT GREEN		1		Character
DARK BLUE		2		Character
RED		3		Character
BLACK		4		Background, border
ORANGE	Modes 3, 5, and 7 (four-color modes)	0	1	Graphics point
LIGHT GREEN		1	2	Graphics point
DARK BLUE		2	3	Graphics point
BLACK		3	–	–
		4	0	Graphics point (background default), border
ORANGE	Modes 4 and 6 (two-color modes)	0	1	Graphics point
		–	–	–
		–	–	–
BLACK		4	0	Graphics point (background default), border
	Mode 8 (1 color, 2 luminances)	–	–	–
LIGHT BLUE		1	1	Graphics point luminance (same color as background)
DARK BLUE		2	0	Graphics point (background default)
		–	–	
BLACK		4	–	Border

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